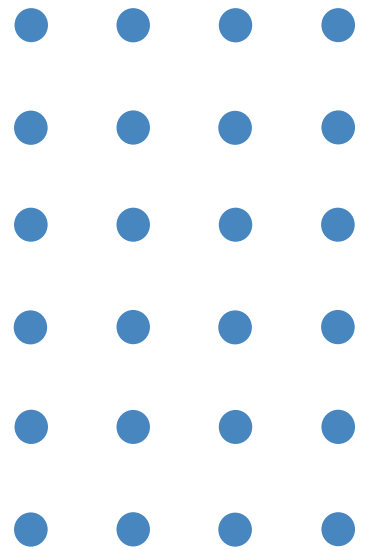
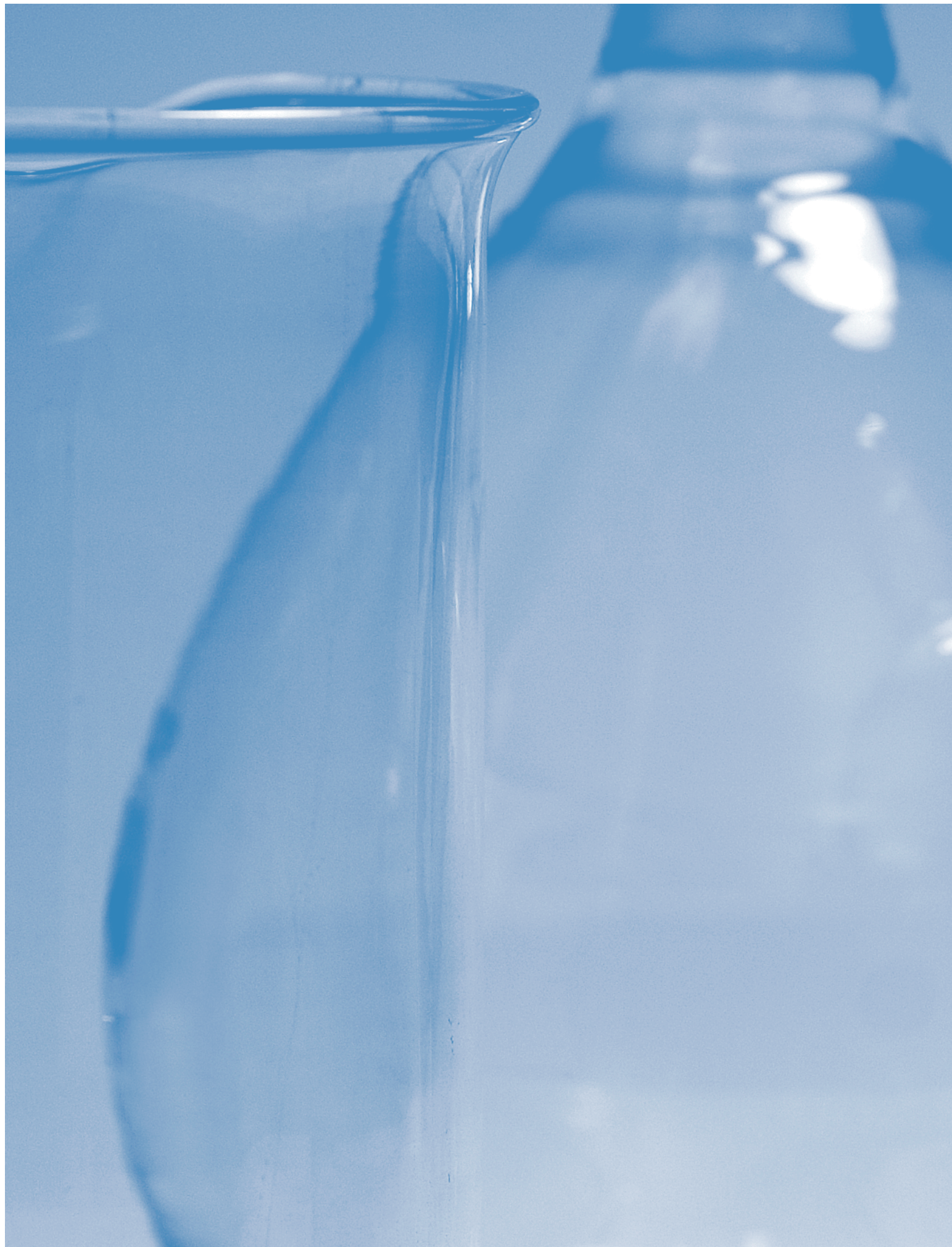


ENHANCING WASHINGTON STATE'S ECONOMIC FUTURE

Commercializing Technology Developed in Our Research Institutions



RECOMMENDATIONS



Letter

Dear Fellow Citizens of Washington State,

The Washington State Economic Development Commission is a group of appointed representatives of the business community initially convened by Governor Locke in 2002 and formalized in legislative statute in 2003 to:

- Review and periodically update Washington state's economic development strategy provide the Department of Community Trade & Economic Development (CTED) with policy, strategic and programmatic direction on
 - strategies to promote business retention, expansion and creation within the state
 - strategies to improve the business climate and stimulate increased national and international investments in Washington state
- Identify and leverage best practices from other states and local economic development partners to assist Washington's small businesses.

The Commission's first four areas of focus have been:

- Recruitment and investments in economic development, including incentives
- Business retention and expansion
- Working with the Washington Economic Development Association to build the capacity of and cooperation among local, regional and statewide economic development activities
- Strengthening the continuum from research enterprise to successful commercialization.

It is the latter of the four initiatives that is the focus of this report. Drawing upon the principles of collaboration with stakeholders, as well as a focus on small business and large-enterprise catalysts which fuel our technology industry clusters, the Washington Economic Development Commission is pleased to present this draft set of recommendations to CTED, legislators, business leaders, our research institutions and the people of Washington state. Nearly 80 people from across the state have been actively involved in the creation of these recommendations.

On behalf of the Commission and the people of the state of Washington, I thank these busy professionals for the commitment of their time, experience, insight and vision in developing and refining these critical recommendations. The Commission welcomes your comments and active engagement in the advocacy for and implementation of these recommendations, as we seek to multiply the return on the innovative ideas and companies born here to the people of Washington state.

Scott Morris
 President, Avista Utilities
 Chair, Washington Economic Development Commission



executive summary

The people and companies of Washington have an extraordinary history of innovation. Early pioneers in timber, aerospace, agriculture, software, and global trade have roots in the state. And much of Washington's historic economic vitality has been accomplished through the hard work and perseverance of these people.

2 As we embark on the 21st century, our past success will not be enough to ensure a strong economic future. Today, goods, services, capital, and increasingly skilled and training-enabled labor are traded globally. Our businesses must compete not just with their counterparts in neighboring states, but against companies in China, India, Korea, Europe and elsewhere as well. In a global economy, companies must either cut costs, increase the quality of their products or consistently innovate to compete in a global economy. Governor Gregoire has made it clear that quality and innovation will be Washington's paths to success.

To succeed, we must help our companies compete smarter by building innovation into every sector of our economy. Washington has a tradition of innovation, but other states have seen how innovation drives economic growth and they are making significant investments—in some cases hundreds of millions of dollars—in their economic futures. Access to technology and an educated workforce enable businesses to innovate, increase their productivity, invent new products and access new markets. Technology and innovation are not just for high-tech industries. Innovation can take the form of a university researcher taking his new technology to market. Innovation can also be a saw blade that won't rust or a new GPS system that reduces the amount of water required to irrigate a field. The key is attracting the best and the brightest to Washington and facilitating the transfer of new technologies into the hands those who need them to compete and succeed.

Other states are increasing their investment in their research institutions, creating centers of excellence, guiding their entrepreneurs to new pools of money, and developing the infrastructure that is necessary to support an innovation-driven economy. We must create a strategic framework for innovation in Washington that ensures that our public investments in education, research, economic development, industrial recruitment, transportation, and other critical foundational initiatives are helpful in attracting, growing, and maintaining 21st century companies. This report presents some of the critical activities, initiatives and investments that we need to make. Other groups such as the Global Competitiveness Council and the Prosperity Partnership have recently reached similar conclusions when they considered the best ways to keep Washington competitive in a global economy.

Investment in innovation is making a difference

In an age of global markets, easy transportation, instantaneous communication and increasing value of the knowledge worker, emerging countries, smaller states and even local communities are securing their place in the worldwide markets by making targeted, strategic investments in innovation. In the United States, over 20 states are currently investing substantially more each year in their innovation economy than Washington. We don't expect to be at the top of this list. But continuing to lag at the middle of the pack will only increase Washington's chances of falling behind instead of leading in and benefiting from those markets and technologies where we could dominate.

Innovation is not just "geek speak." It's not just for PhDs in lab coats. Innovation is new materials that allow our small machine shops to provide their services to medical device manufacturers as well as aircraft companies. Innovation is new energy and power systems that provide additional markets for Washington's farmers. Innovation is secure banking systems that allow small retailers to sell their goods to customers all over the world.

And innovation requires new approaches by government, research institution and business leaders. More aggressive support for developing sources of capital. Modern facilities to attract the best business leaders and researchers. Opening access to local and overseas markets for even Washington's smallest companies.

Washington's *Priorities of Government* investment process provides the mechanism to meet these needs. High priority public investments must, in part, embrace the concept of innovation in order to realize the economic, social and competitive impact for our state. And the *Priorities of Government* process can ensure promise of these benefits to the people of Washington state are not lost.

Commercialization of research is a key to our robust innovation economy

A critical component of a vital state economy is the free and effective flow of new ideas from Washington's researchers and inventors into our companies' products and services; a process commonly called *commercialization*. The Commission undertook to assess and recommend enhancements to Washington's ability to create and commercialize these new ideas. The result of that work is this report and recommendations.

Eighteen months' work has gone into research with stakeholders and developing the set of recommendations that will make a difference for Washington state. More than 100 people actively involved in and affected by technology commercialization from across the state provided their insight, experiences, ideas and support. These people represent small, medium, and large sized companies, state universities and research institutions, and non-profit trade and economic development organizations from across the state.

Much of Washington's commercialization process is going well. Our research institutions have strong and improving programs to ensure that the most promising ideas can make their way into new products and services. Our economic development groups and commercial support infrastructure, both statewide and local, are providing some of the support needed by small and growing businesses to find needed capital, access new ideas and improve their connections to global markets.

But more needs to be done. The taskforce recognized several shortfalls that require attention:

- Too few people have a clear understanding of the potential impact of technology on our future economy and quality of life, and how the commercialization process works to support this growth;
- Roadblocks exist that inhibit the flow of good ideas;
- Too few leaders – in the research community, in the business community and in our civic and elected positions – actively capitalize on Washington's innovations; and
- The financial resources available to our companies, research institutions, technology-based economic development groups and communities are insufficient to effectively adopt and support innovation.

A clear path exists to further improve commercialization in Washington

Two significant results from the work of the Commission have emerged. First, a framework to describe and assess commercialization was developed. This framework outlines the necessary activities for research results to effectively make their way into sustainable and growing business enterprises. (See Appendix 1)

The second result is a set of eighteen recommendations that, if implemented, will significantly improve the impact of research and commercialization in the state. These recommendations are designed to set in course dramatic improvements in:

- *Awareness* – Increase awareness and understanding of Washington's unique technology commercialization dynamics with researchers, inventors, business leaders, elected officials and the general public, both within Washington and outside the state.
- *Funding* – Expand the amount of funding available at the early stages of an innovation-based enterprise and improve the access to capital and other funding sources.
- *Business climate* – Create a commercialization-friendly environment in Washington by improving access to information and decreasing adverse policy and regulatory issues.
- *Collaboration* – Promote research and commercialization collaboration within and among our research institutions as well as between the public and private sector partners within the state.
- *Infrastructure* – Expand the state's infrastructure to support technology commercialization and innovation.

Washington has the history and raw ingredients to continue to be an innovation leader on a global basis. But our unique advantages will be easily be rendered moot without significant attention and investment. Already regions of similar size are moving ahead. In the U.S. alone, states such as Indiana, Oklahoma, Kansas, Pennsylvania, Kentucky and Georgia are investing 3 to 6 times more than Washington. And they are realizing the benefits of expanded entrepreneurial research, new company starts and a growing innovation sector.

The critical time is now for Washington state to act decisively and aggressively. With this report we are committed to placing innovation and commercialization alongside healthcare, personal security, environmental protection and education as a key priority for public investment and leadership attention. We urge you to be part of the future of innovation in Washington and actively work alongside us to turn these recommendations into reality for the people of Washington state.





methodology

Following the Washington State Economic Development Commission's (WEDC) strategic priorities, a Technology Commercialization Taskforce (TCT) was formed (see inside back cover for member list). Co-chaired by members of the WEDC, the Task Force assisted the Commission in preparing a set of recommendations to increase the successful commercialization of innovative technologies developed in the research institutions in Washington State.

This cross-stakeholder group included leaders from: the technology business sector, representing both large established technology enterprises as well as smaller, early stage companies; the Offices of Technology Transfer from the University of Washington, Washington State University, Fred Hutchinson Cancer Research Center, and Pacific Northwest National Laboratory; investors in technology commercialization including independent venture capital and large company new business creation organizations; and Washington state legislators with both backgrounds in and an understanding of the power of technology-based companies to fuel long-term economic growth.

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Before developing recommendations, the TCT recognized that a common framework for the dialog surrounding technology commercialization processes facilitate a shared understanding and vocabulary around the issues. The TCT drafted, vetted and published a backgrounder on the technology commercialization process in Washington state. The framework contained in this backgrounder is reflected in the centerfold of this report, while the full text is included as Appendix 1.

In order to collect input on what's working, what's not, and the role the State, businesses and research institutions can and should play in successful commercialization of innovative technologies, a series of nine focus groups were held in late 2004 and early 2005. These focus groups, combined with individual interviews and supplemental outreach into technology regions throughout the state, represent topical input from those most directly involved in the issues addressed by the TCT's recommendations. Focus groups, interviews and outreach targeted a well-rounded set of representatives from:

- Companies that successfully commercialized technologies from Washington's research institutions;
- Companies that, for whatever reason, have had a less-than-successful experience commercializing technologies from Washington's research institutions;
- Faculty, researchers and active inventors at Washington's research institutions;
- Early stage, venture capital and institutional investors in companies commercializing innovative technologies developed at or in concert with Washington's research institutions.

Further, members of the TCT drew upon a wide variety of findings and best practices from published data, studies, reports and papers from: other states and economic regions in the U.S. and overseas; SSTI (State Science & Technology Institute); AUTM (Association of University Technology Managers); articles from publications ranging from *The Economist* and *The Scientist*; and other sources.

The TCT distilled the input of the stakeholders, reviewed best practices from other regions, attempted to decode the differences which make Washington state both unique and compelling, then developed a set of preliminary recommendations. These preliminary recommendations were presented for feedback to boards and members of the State's technology trade associations (Technology Alliance, WBBA, WSA), as well to stakeholders in the above groups for initial validation of direction. Subsequently, the recommendations were further refined to reflect stakeholder feedback and to add depth. This report is being discussed with a broader set of stakeholders across the state, with the intention of immediately implementing those recommendations which can be acted upon without requiring new or incremental funding or legislative action. In some cases, implementation of the recommendations began in 2005.


The TCT recognizes that at least two other initiatives with similar focus have been studying the same area: Governor Gregoire's Global Competitiveness Council and the Prosperity Partnership. The WEDC's recommendations contained herein draw upon 18 months of research, deliberation and stakeholder input, and as a result often echo or expand upon themes common with these works. The focus of the TCT's recommendations has been on a considered view of "the few that will make the most difference" to stakeholders in the successful commercialization of innovative technologies in Washington state.





research findings

Drawing upon the depth and wide range of input the Washington Economic Development Commission received from stakeholders—including active inventors, researchers, businesspeople creating new companies or commercializing new technologies in their existing companies, investment professionals and others—five key themes emerged in which action is imperative:

- 
- *Increase awareness and understanding of Washington's unique technology commercialization dynamics* with researchers, inventors, business leaders, elected officials and the general public, both within Washington and outside the state.
 - *Expand the amount of funding available at the early stages* of an innovation-based enterprise and improve access to capital and other funding sources.
 - *Create a commercialization-friendly environment* in Washington by improving access to information and decreasing adverse policy and regulatory issues.
 - *Promote research and commercialization collaboration* within and among our research institutions as well as between the public and private sector partners within the state.
 - *Expand the state's infrastructure* to support technology commercialization and innovation.

In addition to a number of topics covered during the course of the nine focus groups conducted with key technology commercialization stakeholders across the state, the WEDC also asked participants what are the key obstacles that they face in commercializing their inventions.

From the perspective of the focus group participants, the top obstacles to the successful commercialization of innovative technologies here in Washington are:

From business leader respondents

1. Access to and availability of early-stage capital
2. The tax climate is hard on early-stage companies
3. Ethics laws restrictions (note: the legislature has subsequently addressed many of these concerns)
4. Patent costs – both the initial and portfolio management costs
5. Assistance and mentoring through the technology transfer and commercialization process.

From faculty / researcher / inventor respondents:

1. Lack of funding for intellectual property protection and the subsequent continuum from proof-of-concept to manufactured and marketed product
2. Complexity of legalities and burdens placed on inventors
3. (Tie) Researchers are not familiar with business or the process of technology commercialization
3. (Tie) Lack of encouragement and incentives for researchers/inventors to get involved in commercializing their ideas
5. Finding commercialization partners.

The participants also offered perspective on the attributes which make Washington an extraordinary state in which to start and grow successful technology-based companies:

- Well-educated people
- Outstanding research institutions and deep, wide research community
- Lots of good ideas
- Knowledgeable support infrastructure (legal, accounting, facilities, etc.)
- Networking and support opportunities
- Increased interest by all parties in: protecting intellectual property (IP); technology transfer from our state's research institutions to businesses inside and outside the state; and entrepreneurship and technology commercialization support.

Drilling Down

COMMON THEME:

Increase awareness and understanding of Washington's unique technology commercialization dynamics with researchers, inventors, business leaders, elected officials and the general public, both within Washington and outside the state.

In reviewing the comments of the investors, inventors and entrepreneurs who participated in the focus groups or were interviewed for this study, the recommendation to create a better understanding of the commercialization process, of what it takes to successfully put emergent technologies into new or expanding businesses, was one of the most common refrains.

One interviewee made the comment that an "awareness package" is needed to help everyone (inventors, business and the public at large) understand the commercialization process while another recommended that all parties to the commercialization process develop a better understanding of the business community's needs and build closer relationships between researchers and business. Another interviewee recommended that there be an entity responsible for providing guidance on what is involved in taking technology to the marketplace and providing the mentoring needed to support this multi-stage process.

COMMON THEME:

Expand the amount of funding available at the early stages of an innovation-based enterprise and improve access to capital and other funding sources.

The need for funding and investment capital to get technologies from concept to product was a subject mentioned by every group interviewed. In fact, it was among the most often cited need in the survey. It was widely recognized also that multiple types of financial support are required to move technology through the stages from lab bench to marketable product.

In the “Research Results” phase of the commercialization process (see diagram at top of page in the centerfold of this document), inventions may have arisen deliberately or inadvertently during a research project that may be little more than concepts that lack proof of validity. The money needed to make a determination whether they might have future commercial value is, unfortunately, often not in the scope of the research program from which they arise. To address the needs for money in the Research Result stage, one inventor suggested that research institutions themselves make available “pilot” funding that would provide a small amount of money to quickly determine whether the concept might have value in a particular application.

Once demonstrated, the technology moves from the “Research Result” stage to the “Technology Concept” phase of commercialization (again, see diagram at top of the centerfold of this document for reference). In this phase, there is need for investment funds to develop the proven technology into a market-ready product. However, as one interviewee pointed out, a lot of money that was previously focused on start-ups has been withdrawn to later stages while another agreed and called this lack of seed capital the biggest problem confronting technology-based economic development in the state. Interviewee suggestions to increase the availability of funds in this stage included finding a way to make use of the investment funds in the control of the Washington State Investment Board (WSIB), and creating a state-sponsored small business investment corporation capable of leveraging funds from the federal government to create a pool of funds for investment.

Finally, if it successfully navigates the other phases, the technology moves to the “Product Concept” stage of the commercialization process. In the Product Concept phase money is needed to support the new or existing business in taking the newly-developed product into the market. In this stage, most of the needs for financing will likely have to be filled by appealing for private capital. One suggestion raised was to find

COMMON THEME:

Create a commercialization-friendly environment in Washington by improving access to information and decreasing adverse policy and regulatory issues.

experienced fundraising “champions” drawing upon emeritus or “serial” entrepreneurs or investors to mentor promising new companies as they attempt to enter the market.

Interest in building a commercialization-friendly environment and culture in Washington was high on the lists of the interviewees from all categories. Issues of concern included the Ethics Law and the negative effect it was having on stimulating the development of new knowledge-based businesses (which has subsequently been largely addressed by the legislature in its 2005 session, and took place in parallel with WEDC’s research interviews); the lack of information on the technologies available from Washington’s research institutions; and, the impact of the tax system on fledgling businesses.

Of concern was the need to provide information on the technologies available from the state’s research institutions to businesses and entrepreneurs and to improve accessibility to those technologies by those who could make commercial use of them. Several investors wanted to see a statewide centralized “go-to” listing of technologies under study and available for licensing, similar in usability to individual guides offered by Stanford, MIT and others. Inventors expressed interest in finding better ways to get technologies “seen” by potentially interested entrepreneurs.

Several participants underscored a related “marketing” need to create more visibility around the successes that have come from the licensing of our state’s technologies to encourage more investors and entrepreneurs both inside and outside Washington to take greater interest in our available technologies.

Finally, with a high degree of consistency, concern was expressed by many entrepreneurs and some investors and about the State’s tax laws. One entrepreneur, for example, claimed that the tax environment in Washington is extremely poor for early-stage companies and illustrated the point by describing that their businesses, although not yet profitable, pay a lot of tax. This entrepreneur went on to say that there just aren’t that many dials to turn in an early-stage technology business to manage expenses except to fire or avoid hiring people, and hence, these taxes are taking away jobs. This same entrepreneur, at the same time praised the R&D tax credit, reporting that it helps to make it possible to generate jobs.

COMMON THEME:

Promote research and commercialization collaboration within and among our research institutions as well as between the public and private sector partners within the state.

Many of the entrepreneurs, investors and inventors interviewed mentioned interest in and the need for tighter, more active collaboration between business and researchers, to better engender innovations with commercial applicability. Two issue areas identified were that:

- The principals in the commercialization process didn't completely understand or appreciate each other's efforts and challenges; and
- There needs to be more effort made to bring a broader number of the principals together around a focused commercialization effort, a willingness to recognize institutional and cultural barriers that some participants face and an ability to reward behavior that challenges inherent organizational or cultural obstacles and encourages commercialization.

To deal with misperceptions and to create a stronger interest in commercialization by all parties, it was suggested that we strengthen the relationships between business and research at the institutional level.

COMMON THEME:

Expand the state's infrastructure to support technology commercialization and innovation.

The need to expand the state's infrastructure to support technology commercialization was echoed by researchers, entrepreneurs and investors alike. The needs identified by all groups were similar. For example, faculty and researchers, eager to attract the "stars" in their respective fields to their institutions, cited the lack of space in which to set up labs and the teams necessary to bring these stars to Washington state, and then keep them here as other research institutions dangle attractive funding and facilities to lure them away.

Entrepreneurs pointed to the need to develop the infrastructure to support start-up companies commercializing technologies developed in our research institutions. Investors mentioned the need for local physical infrastructure and organizations that can serve as early-stage researcher/business collaboration centers, funding sources and mentors.

summary of recommendations

The WEDC Technology Commercialization Taskforce has developed a consistent set of recommendations that if implemented, will significantly enhance the impact of technology on the competitiveness of Washington's companies and therefore on the economic health of our communities. These 18 recommendations address the more than one hundred specific suggestions and issues raised by stakeholders across the state during our research. It is not practical to address each and every of these in this document. Therefore the taskforce has reduced and refined a set that, when completed, will address our state's most critical issues and highest potential opportunities.

Anatomy of Commercialization

During its deliberations, the taskforce created a framework to describe and assess the commercialization process. This framework, described in Appendix 1, clarifies the links among primary elements from basic research activities through to a successful, growing commercial enterprise.

Each successful enterprise relies on success in several areas ranging from entrepreneurship to market dynamics to investment capital to the local business climate. For purposes of technology commercialization the most critical milestone is the development of a valid product concept. By following the process steps leading to this product concept the taskforce was able to connect these commercial elements to the basic research enterprise within our research institutions.

The framework is divided into five conceptual phases; each outlines a distinct stage of the commercialization process.

Basic Research – *innovating* new ideas and research results with viable commercial potential

Applied Research & Development – *refining* the research results by assessing their fitness to solve specific and critical problems

Product Development & Engineering – *demonstrating* that these solutions can be transformed into products with market potential and can be produced economically

Business Planning – *mobilizing* the necessary product, management, investment and infrastructure resources to launch or expand a commercial enterprise based on these products

Business Execution – *succeeding and growing* in an ongoing business operation based on the product and business concepts

It is within this framework that the taskforce was able to develop and place each of the 18 specific recommendations. Doing so allows the entire commercialization process to be considered and to minimize the overlap and redundancy among recommendations.

Innovation increasingly drives Washington's economic growth

Washington's research institutions have a long and successful track record of significant scientific and engineering research. That research has found its way through the commercialization process and into many successful products manufactured within the state and sold around the world.

The TCT recognizes that complacency about this past success is not a recipe for the future. New ideas must make their way into the existing and new products of Washington's companies at an ever-increasing rate. Those ideas will come from researchers and inventors all around the world. One of the opportunities of this report is to describe how a larger portion of innovations can flow from our local researchers.

Thus the TCT recognized that several key elements require attention if this future vision is to be realized. These include the following:

- Too few people have a clear understanding of the potential impact of technology on our future economy and quality of life, and how the commercialization process works to support this growth;
- Roadblocks exist that inhibit the flow of good ideas;
- Too few leaders – in the research community, in the business community and in our civic and elected position – actively capitalize on Washington's innovations; and
- The financial resources available to our research institution, technology-based economic development groups, communities and companies to effectively adopt and support innovation throughout the state are insufficient.

Eighteen specific recommendations

The TCT recommends 18 specific actions that will significantly enhance the impact of science, technology and innovation on Washington's economy. These are summarized on the two-page foldout just following this section, and detailed in the next section. Each of these recommendations connect to one or more of the phases of the commercialization framework. Additionally, they cluster into the common themes uncovered during research with stakeholders.

THEME: Increase awareness and understanding of Washington's unique technology commercialization dynamics with researchers, inventors, business leaders, elected officials and the general public, both within Washington and outside the state.

- R01. Publicize/promote Ethics Act changes
- R09. Report indicators of successful commercialization
- R10. Develop commercialization process roadmap
- R13. Develop technology commercialization presentation and outreach plan
- R14. Promote Washington's innovation climate
- R18. Encourage mentoring across the state

THEME: Expand the amount of funding available at the early stages of an innovation-based enterprise and improve access to capital and other funding sources.

- R04. Increase capital investment in entrepreneurial activities
- R15. Inventory funding sources
- R16. Convene innovators to catalyze early-stage capital

THEME: Create a commercialization-friendly environment in Washington by improving access to information and decreasing adverse policy and regulatory issues.

- R05. Provide access to database of inventions
- R17. Develop tax recommendations promoting entrepreneurial activity

THEME: Promote research and commercialization collaboration within and among our research institutions as well as between the public and private sector partners within the state.

- R02. Deploy Life Sciences Discover Fund for collaborative research
- R03. Recruit entrepreneurial researchers and business leaders to Washington
- R06. Encourage culture and reward structure for collaboration

THEME: Expand the state's infrastructure to support technology commercialization and innovation.

- R07. Expand entrepreneurial training programs
- R08. Expand entrepreneur-in-residence programs
- R11. Increase technology-based economic development funding for technology industry cluster development facilities and entrepreneurial support resources to move Washington to top 25 of states investing in technology-based economic development
- R12. Expand statewide resources for technology-based economic development

State financial support is critical

As is most often the case, any progress toward the goal of higher impact commercialization requires a crucial state investment of public funds. Full progress on these recommendations will require investment from all sectors; and much of that investment already exists or can be refocused.

However, the taskforce recommends that a comprehensive package be developed that includes the proposed state portion from each of the above recommendations. This integrated package allows policy makers and public officials to see the entire scope of their required investment, rather than one piece at a time.

This investment will be large, but it can be one of the most critical and high impact investments of public funds into assuring a bright economic future for decades to come.

Initial discussions should begin during the 2006 Legislative session. The summer 2006 off-session period can then be used to develop a specific legislative package for submission and decision in the 2007 session.

description of recommendations

The Technology Commercialization Taskforce focused its work on those commercially successful enterprises that incorporate new technology or innovation. Other models might involve existing technologies, products or business models that could be the basis for a profitable business; however, in this work we focused on the relationship between technology and commercialization success. In this manner, the TCT identified 18 separate recommendations that, if implemented, will significantly enhance the impact of technology commercialization and establish Washington as a leading state in deriving economic benefit from this impact. Each of these recommendations are described on the following pages and include a number to reference its placement in the commercialization framework (see next two pages), the group responsible for action and the metrics used to gauge success.



1

RECOMMENDATION 1: Publicize and promote the opportunities fostered by the 2005 Ethics Act changes.

(Framework Phase: Basic Research)

Description: In 2005, the Washington Legislature enacted legislation that provided Washington’s state-funded research institutions with the flexibility to establish commercialization-friendly operating policies as related to Washington’s Ethics Act. The business and investment community, along with elected officials and economic development professionals may not yet fully understand the potential of these changes. Therefore the research institutions should undertake this “teachable moment” to publicize and promote the opportunities they envisage being now possible due to these legislative changes. Seminars, newsletters, and web sites are potential vehicles to communicate these changes.

Expected outcomes: Increased commercialization involvement by key researchers, business investors and policy makers due to greater awareness of positive impacts and possibilities as well as clearer understanding of parameters and limitations.

Stakeholders: Research institutions, individual researchers, private investors in publicly developed science and technology.

Responsible party: Washington research institutions.

Resources needed: No new resources are required. Research institutions will use existing resources to develop communication plans appropriate for each institution to inform research personnel of the changes brought about by the revisions of the State Ethics Act enacted in 2005.

Schedule for implementation: Communication of the range of motion for research personnel should be an ongoing activity. However, any new policies and procedures proposed by the research institution and approved by the Governor should be communicated to research personnel within three months after approval and at least annually thereafter.

Measures of success:

- Increase in research personnel seeking and participating in outside relationships;
- Increase in number of invention disclosures to research institutions;
- Increase in industry sponsored research;
- Increase in company starts.

2

RECOMMENDATION 2: Deploy Life Sciences Discovery Fund research investments to encourage research collaborations among private companies and research institutions

(Framework Phase: Basic Research)

Description: The Life Sciences Discovery Fund should be focused to fully take advantage of the breadth of the research and commercial activity being performed all across Washington's life sciences community. The creation of this fund (and the Board of Trustees to manage it) is one of the most significant research developments within recent Washington state history. These resources should be invested in ways which encourage collaboration among researchers in Washington's research institutions and private companies. Additionally, the Fund should endeavor to foster investigation across a wide variety of technologies with life sciences applications.

Expected outcomes: Higher impact commercialization of research concepts due to collaborative development and funding.

Stakeholders: Life sciences researchers within Washington research institutions and companies commercializing collaborative innovations.

Responsible party: Trustees of the Life Sciences Discovery Fund.

Resources needed: Research funds from the Life Sciences Discovery Fund.

Schedule for implementation: Ongoing.

Measures of success:

- Number of collaborations between companies and research institutions;
- Number of life-sciences related invention disclosures at research institutions;
- Number of licenses for discoveries made with the fund's support to Washington companies;
- Number of new development projects in companies that engage in collaborations.

Best Practices: Following the 1998 settlement, states across the country set up dedicated funds to support research and benefit TBED. For example, as reported by the State Science and Technology Institute (SSTI) in their Weekly Digest for August 29, 2005, Arkansas approved a plan in 2001 to fund biomedical research. Also included in the legislation is a stipulation providing for capital funds of up to \$60 million to improve the University of Arkansas Bioscience Center.

Georgia has been investing its receipts in research since 2000. The Georgia Cancer Coalition (GCC) focuses on fostering fundamental and translational cancer research. Through FY 2004, more than \$178 million has been allocated to GCC from the Tobacco Settlement Trust Fund.

continued on page 22

Commercialization Framework					BUSINESS EXECUTION	
	INNOVATING	REFINING	DEMONSTRATING	MOBILIZING	SUCCEEDING & GROWING	
External Factors	<p>Research Personnel</p> <p>Facilities</p> <p>R&D Funding</p> <p>Shifts in Federal R&D Funding</p>	<p>Intellectual Property Protection</p> <p>Opportunity Recognition</p> <p>Research Result</p> <p>Personnel</p> <p>Proof-of-Concept Funding</p> <p>Market Maturation</p> <p>Idea Generation</p> <p>Cultural Motivation</p>	<p>Zeal</p> <p>Technology Concept</p> <p>Support Concepts</p> <p>Development Capital</p> <p>Innovation Infrastructure</p> <p>Market Timing</p> <p>Market Maturation</p> <p>Idea Generation</p> <p>Cultural Motivation</p>	<p>Entrepreneurship</p> <p>Product Concept</p> <p>Market Size</p> <p>Market Access</p> <p>Investment Capital</p> <p>Local Business Climate</p> <p>Market Readiness</p>	<p>New or Expanding Commercial Enterprise</p> <p>Market Sustainability</p>	
Outcomes	<p>Exciting, unique technology-based idea is linked to a potential market need and certain research outcomes are recognized as the genesis of a potential commercial enterprise that can benefit the people of Washington state.</p>	<p>Definition of an idea's technical feasibility, commercial potential and plan for taking it further occurs...so that the market and business potential of the technology can be efficiently and fully explored.</p>	<p>Incorporating the technology in compelling, market-ready products, services and/or processes is pursued...so that the innovation can be transformed into a compelling product for markets in Washington state and around the world.</p>	<p>Enterprises are created or expanded that in turn produce opportunities for new products, services and jobs for the broad set of business and support services throughout the state of Washington.</p>	<p>Long-term value and reinvestments in innovative technology applications are created, fueling the growth of jobs, wealth, and the tax base in Washington state and beyond.</p>	
Washington Strengths/Platforms for Success	<p>Washington's research institutions collectively attract almost \$2 billion in federal funding annually.</p> <p>The Life Sciences Discovery Fund has been approved, making significant research funding available to Washington institutions.</p> <p>The Ethics Law has been made compatible with guidelines that other research institutions confront.</p>	<p>Major research institutions in the state (UW, WSU, FHCR, PNNL, etc.) are home to world-class scientists and facilities.</p> <p>Washington's research institutions have IP rights with the potential to be leveraged to benefit the state's economy.</p> <p>Washington State has a well-educated workforce who have the foundation to capitalize on technology innovations.</p>	<p>Grants for technology development, programs in technical assistance, new business incubation and business development support are broadly available from WTC, WRF, PNNL and major universities in Washington.</p>	<p>An infrastructure supportive of emerging industry clusters around the state. One example includes the bio-tech industry cluster being developed in South Lake Union.</p> <p>The state's major universities have adopted aggressive new programs to train entrepreneurs capable of building new businesses or creating new lines of business in established firms.</p>	<p>Washington is ranked first nationally among states in the number of new business starts annually (per capita).</p> <p>The business support infrastructure (attorneys, accountants, etc.) in Washington State is robust and knowledgeable about the special needs of companies commercializing innovative technologies.</p>	
Challenges	<p>Growth and diversification of R&D funding is occurring in Washington research institutions.</p>	<p>Increasing attention to both industry and state economic development needs/priorities.</p>	<p>The research institutions are proactively spearheading the pursuit of collaborative</p>	<p>Through the Offices of Technology Transfer, Washington's research institutions have, in the</p>		

<p>What's Working Well a</p> <p>WA's Research Institutions</p>	<p>Development of new facilities for R&D (e.g. PNNL Research Campus of the Future, UW South Lake Union project, WSU Biotechnology Research & Education Complex).</p> <p>Increasing number of research collaborations and shared facilities among Washington's research institutions (e.g. PNNL & WSU BioProducts Facility, WSU/USDA-ARS collaboration on Biotechnology Research & Education Complex).</p>	<p>Development of new incentives, tools, resources and processes to streamline the identification, patenting and nurturing of innovations with possible commercial potential.</p> <p>New programs & organizational structures to address proof-of-principle funding for early technologies (e.g. GAP funds (FHCRC, WSU, UW), IR&D & tech maturation funds (PNNL)).</p>	<p>commercial/institutional research projects to link high-potential inventions with industry funding and commercialization expertise.</p> <p>A variety of licensing structures are being developed to expedite and encourage licensing of new technologies.</p> <p>WTC's Research & Technology Development program has funded nearly 500 industry-university partnerships in Washington.</p>	<p>past few years, increased focus on personnel, infrastructure and external resources to support successful commercialization of new technologies.</p> <p>WTC's Angel Network is expanding the available capital in communities across all of Washington state.</p>
<p>Opportunities & Needs</p>				<p>Increase awareness about commercialization for business leaders, elected officials and general public, both within Washington and outside the state.</p> <p>Expand amount of funding available and improve access to capital and other funding sources.</p> <p>Create a commercialization-friendly environment in Washington by improving access to information and decreasing adverse policy/regulatory environment.</p> <p>Promote research/commercialization collaboration within/among research institutions and between public and private sector partners within the state.</p> <p>Expand the state's infrastructure to support technology commercialization and innovation.</p>
<p>Recommendations</p>	<p>R01 - Publicize and promote the opportunities fostered by the 2005 Ethics Act changes.</p> <p>R02 - Deploy Life Sciences Fund research investments in ways which encourage institution/industry research collaborations across a wide variety of technologies with life sciences applications.</p> <p>R03 - Develop recruitment program to encourage entrepreneurial researchers and rainmakers to come to Washington, providing sufficient funding to hire "stars" which serve as a magnet for additional funding and expert personnel.</p> <p>R04 - Increase state funding to research universities & their capital budgets for research facilities to expand their capacity to host and support projects with commercial potential.</p>	<p>R05 - Provide access to inventions and technologies available for development & licensing from all Washington research institution databases.</p> <p>R06 - Encourage a culture/rewards structure for commercialization and industry collaboration in our research institutions and provide funds which enable universities to orchestrate public/private research programs.</p> <p>R07 - Enhance/expand entrepreneur training programs for researchers, faculty & students at Washington's research institutions.</p> <p>R08 - Establish/expand entrepreneur-in-residence programs at Washington's research institutions.</p> <p>R09 - Publish report based on leading indicators for successful commercialization in annual Washington Index of Innovation. Suggested Lead: WRITTO</p>	<p>R10 - Develop and communicate Washington technology commercialization process roadmap.</p> <p>R11 - Increase funding earmarked for technology industry cluster development facilities and entrepreneur support resources so that Washington moves from the bottom half to the top 25% of states investing in technology-based economic development.</p> <p>R12 - Expand resources and focus CTED's, WTC's and SIRTII's technology-based economic development activities on the start, expansion and retention of technology companies, enhancing technology industries in rural areas, and demonstrating measurable outcomes on high-wage/multiplier job generating technology clusters in Washington State.</p>	<p>R13 - Develop presentation and script highlighting strengths of Washington's technology development resources and environment for business growth and proactively use it both inside and outside the state. Create an information dissemination plan to highlight for state residents the economic & job value of technology research activities in Washington.</p> <p>R14 - Promote Washington's innovation climate through direct involvement of Governor Gregoire and the leadership of our state, business and research institutions.</p> <p>R15 - Develop easily accessible inventory of funding sources available for technology development and commercialization.</p> <p>R16 - Convene those who are exploring innovative ways to source and access early-stage capital to catalyze insights into action.</p> <p>R17 - Develop set of specific tax policy recommendations and other actions to foster a vibrant entrepreneurial culture in Washington State.</p> <p>R18 - Encourage development of mentoring programs at institutions and within communities across the state.</p>

2

continued

In 1999, former Michigan Gov. John Engler signed a bill committing \$1 billion over 20 years from the tobacco settlement for life sciences research, development and commercialization. Budget restraints have slowed the commitment in recent years, although Gov. Jennifer Granholm has stated that she intends to restore the Life Sciences Program budget to the original investment in the near future. To date, Michigan has invested \$220 million into this initiative.

Ohio's Governor Bob Taft created a task force in 1999 to determine the best use of the tobacco settlement funds. A portion of the funding was put into the state's Biomedical Research Program, which provides grants to support biomedical and biotechnology research leading to technology commercialization. Between 2001 and 2004, approximately \$55.5 million from the tobacco settlement has been invested in bioscience research and development.



Recommendation 3: Recruit entrepreneurial researchers and business leaders to Washington

(Framework Phase: Basic Research)

Description: Develop recruitment program to encourage entrepreneurial researchers and rainmakers to move their base to Washington, providing sufficient funding to hire the “stars” which in turn serve as magnets for additional funding and expert personnel. The WEDC TCT recommends that a program be created and funded by the state to recruit a minimum of 10 significant entrepreneurial researchers over the next 10 years.

Expected outcomes: Increased capacity in Washington for entrepreneurial development of commercially-viable research results.

Stakeholders: Research institutions, Governor.

Responsible party: Research institutions.

Resources needed: Research institutions will develop plans for the recruitment of new research personnel. Legislature will fund the recruitment of one star researcher per year at each state-funded research institution, a special designation of approximately \$10 million per year.

Schedule for implementation: Annual commitment from Legislature for one star per research institution for 10 years.

Measures of success:

- Successful recruitment of at least 10 entrepreneurial researchers into Washington’s research institutions over the next decade.
- At least 10 companies relocate to Washington to be near the nexus of innovation in their fields.

Best Practices: This is a strategy for growth in technology-based development that many states are using and others are contemplating. For example, Iowa Governor Tom Vilsack recently announced his plans to spend \$50 million “to attract leading scientists to Iowa and spark new research and product development.” Last year the Utah Science, Technology and Research Initiative was appropriated \$4 million to attract world-class research teams in targeted disciplines where Utah already has distinct competitive advantages. The teams develop products and services that can be commercialized in new business industries that will create higher-paying jobs.

4

Recommendation 4: Increase capital investment in entrepreneurial activities at state universities

(Framework Phase: Basic Research)

Description: Increase state funding to research universities and their capital budgets for research facilities to expand their capacity to host and support projects with commercial potential.

Expected outcomes: Sufficient availability of state-of-the-art laboratory and research facilities, surrounded by a rich set of shared resources to attract and retain the best and the brightest researchers and faculty to Washington state's research institutions.

Stakeholders: Governor, State Legislature.

Responsible party: Research institutions.

Resources needed: State funding to research universities and their capital budgets for research facilities to support research and to expand their capacity to host and support projects with commercial potential.

Schedule for implementation: Ongoing.

Measures of success:

- Development of commercialization clusters at research institutions;
- Increase in grant funds to research institutions;
- Increase in invention disclosures at research institutions;
- Increase in company starts from research institutions.

Best Practices: France announced in November 2005 that it will double its funding for the Industrial Innovation Agency (IIA) to \$1 billion, and give \$350 million to the National Research Agency (ANR). The Industrial Innovation Agency was created to fund large national champions in industrial R&D and technology development programs including commercial projects in the fields of solar energy, nanotechnology, biotechnology and bio-fuels. The ANR was created to support the development of basic and applied research, innovation and partnership between the public and private sectors, and contribute to the transfer of technology produced by publicly funded research to the commercial world. The ANR will fund research projects selected by competitive peer review on the basis of scientific and technical excellence criteria, thus introducing a new approach in how research is funded in France.

North Dakota's universities and colleges compete for a share of \$20 million in matching funds to create Centers of Excellence that focus research on projects with commercial potential. The money is part of the state legislature's \$50 million commitment to the Centers program, designated to transform the state's economy toward science and technology. The initiative is designed to pursue academic excellence and spur R&D, new technology, and job creation. Centers will be located on university campuses throughout the state and will focus on technology, aerospace, value-added agriculture, energy, advanced manufacturing, and tourism. Centers must match each state dollar invested with private or non-state public funds.

5

Recommendation 5: Provide access to a database of inventions*(Framework Phase: Applied Research and Development)*

Description: Provide access to a single-point, constantly-updated directory of inventions and technologies available for development and licensing from all Washington research institution databases. The research institutions have already developed and implemented individual databases of technologies available for commercialization. This integrated database will provide common fields and work with the research institutions to draw appropriate data from the existing research institution's databases. Once populated, this searchable front end should be prominently hosted online by a neutral third party with technology commercialization expertise and resources: Washington Technology Center (WTC).

Expected outcomes: Easy access to research results by research collaborators and commercial enterprises.

Stakeholders: Entrepreneurs, investors, potential licensee companies, research institutions, Washington Technology Center.

Responsible party: Washington Technology Center, research institutions.

Resources needed: Washington Technology Center requires additional resources to coordinate with research institutions within the state. The research institutions require resources to adapt databases and make appropriate changes to coordinate with the WTC. One hundred thousand dollars (\$100,000) total is required for the first year to create the infrastructure and interface for the aggregated and heavily-linked website.

Schedule for implementation: The design and implementation plan will be completed nine months after funding is available.

Measures of success:

- Number of searches of the integrated front end;
- Number of deals initiated at the research institutions;
- Number of deals completed;
- Expenditures of industry sponsored research conducted at the research institutions.

Best Practices: The iBridge model recently introduced by the Kauffman Foundation is a program used by institutions to distribute information about and license their intellectual property. It can also expand the number and scope of collaborative relationships by increasing awareness of existing research across the country. According to the Kauffman Foundation, these relationships are a critical component in advancing new discoveries and may lead to more ideas and inventions.

6

Recommendation 6: Encourage a culture and rewards structure for collaboration within our research institutions

(Framework Phase: Applied Research & Development; Product Development & Engineering)

Description: Cultural differences make collaborations between research institutions and commercial enterprises difficult. Since researchers are significantly motivated by seeing their work have impact on society, funding students, and enabling laboratory operations, appropriating funding for programs such as the proof-of-principle programs described here have the potential to significantly advance such changes. The TCT recommends that funding be provided explicitly for the purpose of orchestrating public/private partnerships involving the state's research institutions. Moreover, in appropriate ways, the research institutions are encouraged to develop or enhance processes for promotion and research advancement procedures which encourage commercialization and industry collaboration.

Expected outcomes: Increased number of faculty and institution researchers interested in participating in the commercialization of their research results.

Stakeholders: Inventors, entrepreneurs, investors, offices of technology transfer, state-funded research institutions, and the state and federal governments on behalf of their citizens.

Responsible party: Governor's Science and Technology Advisor, research institutions.

Resources needed: From existing resources, research institutions should consider how culture is communicated and how rewards are distributed to those researchers who are engaged in commercialization and collaboration with industry. The Universities' joint budget request for such programs should be funded by the legislature.

Schedule for implementation: This will require different lengths of time at different institutions. It is hoped that all will agree to construct policies to address the problem/opportunity in 2006.

Measures of success:

- Number of invention disclosures; number of conflict of interest disclosures;
- Number of applications for prototype funding; number of licensing deals initiated/completed;
- Total industry sponsored research expenditure.



Recommendation 7: Enhance entrepreneurial training for researchers, faculty and students

(Framework Phase: Applied Research & Development)

Description: Among the most persistent constraints to the launch of successful technology-based new ventures is that lack of experienced entrepreneurs with the technical skills to conceive of and market new businesses. The State should develop and implement a comprehensive strategy to engage and assist entrepreneurs. Key elements of this strategy should include methods and programs to deliver high quality advice and mentoring to entrepreneurs and access to critical resources. This should be accomplished in part by building on the very successful entrepreneur programs at Washington's major research institutions. The University of Washington has a program to enroll and train graduate students from law, sciences, humanities and business in entrepreneurship leading to a certificate in entrepreneurship. WSU and PNNL have partnered in the formation of the Institute for Technology Entrepreneurship with the objective of creating a similar program. These programs involve multidisciplinary students, faculty, entrepreneurs and investors in building business models and evolving business plans around innovative ideas.

Expected outcomes: The current programs are scaleable and should be broadened to form the archetype for a comprehensive entrepreneurial assistance program open to ideas and entrepreneurs from outside and within our major universities.

Stakeholders: Washington research institutions, angel and venture investors, and taxpayers.

Responsible party: Research institutions.

Resources needed: An ongoing legislative appropriation of \$350,000 to each of the major research universities is sufficient to bring about the outcomes mentioned below.

Schedule for implementation: Ongoing.

Measures of success:

- Number of matriculating students from science, math and business who achieve Certificates in Entrepreneurship from Washington universities;
- Number of new technology-based ventures created and located in Washington that originate from these programs.

Best Practices: Carnegie Mellon University's DHJ Center for Entrepreneurship has found that working closely with the technology transfer office can increase the entrepreneurial skill development of faculty, staff and even the external community while building successful new ventures around the campus. By bringing together the skills of the MBA students to find the markets for new technologies with student and faculty inventors, investors and seasoned entrepreneurs, their program produced four new ventures in 2004. At the end of 2004, three of these ventures had angel or venture funding and one had achieved a capitalization of \$4.2 million.

8

Recommendation 8: Establish and expand entrepreneur-in-residence (EIR) programs*(Framework Phase: Applied Research & Development)*

Description: Establish/expand entrepreneur-in-residence type programs at Washington's research institutions. These institutions will engage experienced managers and entrepreneurs to start enterprises from the institution's own research. Several research institutions around the nation have found that the availability of experienced managers and entrepreneurs who understand the technology and can start a company is the limiting element in commercialization of research results. When entrepreneurs are housed within the research institutions, they work closely with the inventors while simultaneously mentoring potential student or staff entrepreneurs.

Expected outcomes: Increased commercialization of Washington research institutions' research.

Stakeholders: Washington research institutions, entrepreneurs and growing businesses.

Responsible party: Research institutions.

Resources needed: University of Washington and Washington State University currently have a joint funding request required before the Legislature that includes this activity. The task force strongly recommends supporting that request.

Schedule for implementation: Planning for programs at the UW and WSU are underway and are ready to be implemented within the year of funding available. PNNL is also strongly considering an EIR program to boost the number of start-ups and the impact of commercial outcomes from their technologies.

Measures of success:

- Increased number of new company starts from research institutions;
- Number of students or staff interacting with entrepreneur-in-residence during the on-site portion of the project;
- Amount of industry sponsored research conducted at research institutions.

Best Practices: The Johnson Center for Entrepreneurship and Innovation at Indiana University has had an entrepreneurship in residence program for a number of years. Rather than a paid position, they invite leading entrepreneurs to simply spend time on the campus. Past EIR's have included Dr. Roger Newman, co-founder of Lipitor, Herb Kelleher, founder and executive chair of Southwest Airlines and Jack Stack, CEO of SRC Holdings Corp.

Both Los Alamos National Laboratory and Sandia National Laboratory have established Entrepreneur-in-Residence programs to help identify and move technologies out of the lab and into new ventures. Having an entrepreneur who understands the R&D environment and the challenge of commercializing early stage technology has been successful in identifying new business ventures based on lab-developed technologies.



9

Recommendation 9: Report leading indicators of successful commercialization

(Framework Phase: Applied Research & Development)

Description: Expand Washington Technology Center's (WTC) annual *Washington Index of Innovation and Technology* to include leading (rather than just trailing) indicators of successful commercialization. The state's research institutions should work with the WTC to determine which leading measures of success should be incorporated into the report. Such additional measures will facilitate the tracking of changes from the current baseline achieved through implementation of the recommendations contained here. WTC will then monitor the trends from the baseline which will allow policy makers to annually assess progress and gain early insight into Washington's performance commercializing technologies from competitiveness and policy-making standpoints.

Expected outcomes: Easily available metrics to anticipate and understand Washington's trends and competitiveness in technology commercialization success.

Stakeholders: Washington policy makers.

Responsible party: Washington Research Institutions Technology Transfer Alliance (WRITTA), WTC.

Resources needed: No additional resources required. From existing resources, the research institutions will work with the WTC to determine additional measures. From existing resources, the WTC will annually develop and publish the *Washington Index of Innovation*.

Schedule for implementation: By June, 2006, an agreed-upon set of leading indicators will be developed. The WTC will annually publish the *Index of Innovation* that allows policy makers to track the impact of activities developed to enhance commercialization.

Measures of success:

- Credible set of leading indicators are developed collaboratively among the research institutions and commercialization organizations;
- WTC incorporates indicators into its annual report.

Best Practices: Massachusetts has been a leader in developing regular reports showing the impact of innovation and technology on the economy of the state. They were the first to produce such a report and have continually updated its format to provide business leaders and policy with the latest, most relevant information.

10

Recommendation 10: Develop and make available tools that explain and demystify Washington's technology commercialization process

(Framework Phase: Product Development & Engineering)

Description: A number of inventors and investors suggested that having information available on what it takes to commercialize technologies from Washington's research institutions would be very helpful. They also mentioned the importance of knowing where to find some of the resources needed to support that process. As one interviewee put it, "the public literacy around these issues is about as close to zero as it can get."

What's needed is a resource guide that will take the mystery out of the process that leads from technology development to business formation and includes an overview description of the technology transfer process. A portion of this guide would include explanations of and links to the technology transfer organizations of research institutions such as UW, WSU, Fred Hutchinson Cancer Research Center (FHCRC) and PNNL. Each of these institutions has a different set of contacts and protocols for commercialization and their web sites provide the best source of information on how to interact with each institution.

In addition entrepreneurs, potential investors and inventors need a set of tools they can use to evaluate technology concepts and market opportunities for their new ideas, find and involve mentors and others willing to assist them in commercialization and, provide them the training and the forums to present their product concepts to the people that can help them become successful. Such tools could include entrepreneur and commercialization "boot camps" for interested inventors and entrepreneurs linked to the program identified in Recommendation 7.

Expected outcomes: Inventors, researchers, and budding entrepreneurs, armed with a deeper understanding of the factors associated with commercialization and company-creation success will no longer fear the unknown path, enabled to move more quickly and efficiently through this sometimes harrowing process.

Stakeholders: Entrepreneurs and investors interested in commercializing technologies from Washington research institutions

Responsible party: Washington Technology Center.

Resources needed: Developing the initial resource guide will require \$100,000.

Schedule for implementation: 12 months following the authorization of funds (June 2007).

Measures of success: Primary measure of success is the number of potential entrepreneurs, inventors and investors accessing and taking advantage of the tools for commercialization. In the longer term, the measure should be an increase in the success rate of technology-based entrepreneurial ventures and the number of new business starts or expansions that partially credit this program for their success.



Recommendation 11: Increase technology-based economic development (TBED) funding for technology industry cluster development facilities and entrepreneur support resources to move Washington to top 25% of states investing in TBED

(Framework Phase: Product Development & Engineering)

Description: Continued economic success relies on renewal of the state's long term expectations for the impact of innovation and technology on our economy and the programs implemented to achieve those expectations. Washington has a unique mix of new and mature high-tech industrial sectors that can form the basis for long-term growth and the prosperity. What's needed is to identify those sectors with the highest growth potential that can leverage the technologies and research capabilities of our research institutions to create a broad supportive infrastructure and new competitive enterprises. Among the support mechanisms needed to achieve this growth is the matriculation and retention of trained entrepreneurs who have the vision to imagine new products latent in raw technology and the skills to get them to market. Coordinating these efforts with CTED's cluster-based economic development strategy will allow higher leverage and greater impact to the state.

Expected outcomes: One measure of the economic health of a state is its level of investment in programs directed at technology-based economic development. When other states are investing hundreds of millions of dollars to create technology sector clusters, states participating at levels significantly below those of their "competitors" leave their futures to the vagaries of chance.

Stakeholders: Washington's growing companies, communities building their economic base.

Responsible party: To be determined.

Resources needed: The TCT recommends that Washington, as a leading technology state, invest at least \$25 million dollars in technology-based economic development programs each year to move into the first quartile among the states.

Schedule for implementation: Activity begins with the authorization of funds.

Measures of success:

- Identification of specific technology clusters that reflect the workforce skills and research capabilities of the State's industries and universities;
- Investment in these clusters;
- Increased employment and economic activity associated with these targeted investments.

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Best Practices: Building upon its \$100 million investment fund, Utah's governor has announced a new cluster-based strategy and \$62 million in FY2007 targeting state efforts in seven industry sectors: life sciences; software development and information technology; aerospace; defense and homeland security; financial services; energy and natural resources; and competitive accelerators, such as nanotechnology and advanced manufacturing. New York has appropriated \$520 million to TBED. The Kansas legislature in 2004 has set an agenda to invest \$500 million over 10 years to encourage research, innovation and technology commercialization in their state.

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Recommendation 12: Expand resources statewide for technology-based economic development activities, focusing on regional capacity building.

(Framework Phase: Product Development & Engineering; Business Planning; Business Execution)

Description: By expanding the capacity of each of our communities to promote, support, recruit and finance growing innovative companies, Washington's economy will continue to expand and remain robust. Building this capacity in communities around the state requires an investment. Expand resources and focus the technology-based economic development activity within Washington's Department of Community, Trade and Economic Development, Washington Technology Center and Spokane Intercollegiate Research and Technology Institute on the start, expansion and retention of technology companies; enhancing technology industries in rural areas; and demonstrating measurable outcomes on high-wage/multiplier job generating technology clusters in Washington state. Providing resources to local organizations that can effectively support TBED, such as Economic Development Commissions (EDCs) or Ports, will be effective in extending the reach of TBED into communities across the state who have targeted TBED as an economic growth strategy.

Expected outcomes: Through this program, technology companies will be started and grown in both urban and rural portions of the state, enabling the development of new technology clusters statewide.

Stakeholders: Washington's growing companies, researchers

Responsible party: Washington's Department of Community, Trade and Economic Development, Washington Technology Center, and Spokane Intercollegiate Research and Technology Institute.

Resources needed: Existing resources within the organizations can be more focused on these outcomes. The state needs to provide \$5 million per year (ongoing) in additional funding for these regionalized TBED support programs.

Schedule for implementation: Develop integrated proposal in partnership with the Governor's office for submission to the legislature for the 2007 session.

Measures of success: Increased state investment in TBED programs and organizations so that the benefits of successful technology commercialization can be realized across the state.

Best Practices: Catering to high-tech companies built on innovation, the nonprofit regional collaboration dubbed SPARK, hopes to transform Ann Arbor, Michigan into more of an entrepreneurial hub and triple the number of technology jobs within five years. University, business, government and community leaders are

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partnering to provide services to new and emerging high-tech businesses and organizations within biotechnology, information technology, energy, advanced manufacturing, and security. Five primary services to be offered include business acceleration, business outreach, talent development, early-stage funding, and regional marketing and events. SPARK has raised \$2 million toward a \$3 million, three-year operating goal with the largest commitment coming from University of Michigan.

13

Recommendation 13: Develop technology commercialization presentation and outreach plan

(Framework Phase: Business Planning)

Description: Develop a presentation and script highlighting strengths of Washington's technology development resources and environment for business growth. Proactively use it both inside and outside the state. Create an information dissemination plan to highlight for state residents the economic and job value of technology research activities in Washington. (See also recommendation 14)

Expected outcomes: Easy to use, high impact information available to all Washington leaders to promote commercialization of Washington technology and the state as an innovation leader.

Stakeholders: Washington residents, business and investment community both inside and outside Washington.

Responsible party: Department of Community, Trade and Economic Development/Economic Development Division.

Resources needed: \$75,000 – one time appropriation or redirected funding from within CTED. Most of the resources to implement this recommendation will be in-kind – the commitment and time of Washington's business and civic leaders to make the presentations and "tell the story."

Schedule for implementation: Presentation completed by September 2006. First set of presentations to business communities in Washington and target U.S. and international groups between September 2006 and June 2007.

Measures of success: Presentation of Washington technology/commercialization competencies to at least 50 groups inside, and especially outside, the state.



Recommendation 14: Promote Washington's innovation climate through direct involvement of the state's leadership

(Framework Phase: Product Development & Engineering)

Description: Washington must build our reputation as an ideal home for entrepreneurs, world-class researchers and innovative technology companies. This will take at least two key steps:

- 1) Build a set of common themes, consistently voiced and aggressively promoted by the Governor and our state's business and institutional leadership when speaking inside and outside the state, that underscore Washington's strengths as a great state for businesses built on technology innovations; and
- 2) Washington needs to create more visibility for our innovation successes both across the state and around the world.

Common messages need to be repeated, forming at the core of presentations and discussions when on national and international trade missions, at national/international high-profile target industry events such as BIO, and in any interaction with researchers and/or business leaders from other states and countries. Washington state suffers from being perceived by those both inside and outside the state as being less than pro-business. All who participated and provided comments to this report agreed that Washington must "develop a reputation as the state that supports the commercialization of good ideas."

Expected outcomes: Greater awareness and support through increased understanding of impact by all stakeholders. Attracting, retaining and growing world-class pharmaceutical, technical and technical manufacturing companies should be our goal.

Stakeholders: Washington's citizens who depend on the creation of wealth and new jobs in Washington are the stakeholders. Engage other organizations such as WTC, WSA, Technology Alliance, Global Competitiveness Council, Washington Roundtable, EDCs, Chambers, university and research institution leaders.

Responsible party: Governor Gregoire, Washington State technology business leaders, and leaders from our research institutions.

Resources needed: No new resources anticipated in order to draft core themes and evangelize their use.

Schedule for implementation: Immediately, with core themes identified and popularized by mid-2006.

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**Measures of success:**

- number of new technology-based enterprises that are successfully launched
- the amount of public investment associated with each new enterprise

Note: A social ROI that includes returns on the basis of jobs and taxes to the investment made by the state should be used to determine whether the investments are socially profitable.

Best Practices: See Pennsylvania's newly-launched economic development site at www.newpa.com, where a wide range of links provide video testimonials from Pennsylvania's leading CEOs, Governor Ed Rendell outlines his \$2.3 billion economic stimulus program, and 35 of Pennsylvania's TBED organizations published their groundbreaking 2005 TechFormation Report.



Recommendation 15: Develop easily accessible inventory of funding sources

(Framework Phase: Business Planning)

Description: Growing companies do not always know which sources of funding may be appropriate or reliable for their specific situation. An easily available “catalog” describing the various sources of funding available to these companies can be extremely helpful to minimize the difficulty in matching a company’s needs to the potential funding sources. Much of the effort in this recommendation will be directed toward educating companies across the state about this directory and the various funding sources it contains.

Examples of resources that should be included in this inventory include CTED’s economic assistance funds such as those managed through the Community Economic Revitalization Board (CERB) and the Washington Economic Development Finance Authority (WEDFA), as well as the federal sources such as Small Business Innovative Research.

Expected outcomes: Information about potential funding sources is more easily accessible by companies across the state, making it more likely that inventors and entrepreneurs find needed funding to move their inventions along the commercialization continuum to success.

Stakeholders: Washington’s growing companies.

Responsible party: Washington Technology Center.

Resources needed: Initial implementation requires no additional resources. Maintenance of this inventory in the longer term will require a small reliable, ongoing source of funding.

Schedule for implementation: Initial development of the inventory should be completed by the end of FY2007.

Measures of success: The frequency with which companies seeking sources of funding use this information will be the primary measure of its success.

16

Recommendation 16: Convene funding innovators to catalyze formation of early-stage capital*(Framework Phase: Business Execution)*

Description: Increasing the amount of early stage investment capital available to Washington's growth companies has been an issue taken up by many groups across the state, and with several different perspectives. Individual groups may choose to create new programs that either support access to early stage capital or provide that capital directly. In order to encourage this creative thinking to continue and to make it as efficient as possible, the TCT recommends an ongoing dialog among these various groups and individuals to share their perspectives and lessons learned. The Technology Alliance (TA) is currently investigating specific elements of this early stage capital problem. Their activity is a good example of the innovative actions this recommendation intends to encourage. Convening these innovative public and private sector people that can expand the amount of early stage capital will provide encouragement for these people to continue their efforts to create new capital sources.

Expected outcomes: Increased commitment by business leaders and investors to expand early-stage capital while reducing the overlap among various groups working on the problem.

Stakeholders: Business leaders, policy makers and investors interested in creating additional sources of capital for Washington's growth companies.

Responsible party: Washington Technology Center and Technology Alliance (as conveners); public and private sector people and organizations (to create new capital sources).

Resources needed: No additional resources required.

Schedule for implementation: WTC and TA convene the first roundtable in 2006.

Measures of success: Successful, ongoing dialog and exchange of lessons learned among interested groups and people.

Best Practices: The Oregon Legislature created venture development funds to facilitate technology commercialization for students and faculty at the state's seven public universities. Revenue for these newly created funds will come from donors who, in turn, receive state income tax credits. The development funds will use capital raised through university foundations to bridge the gap between an idea and the point where private investors become interested. Universities that license the inventions are required to return 20 percent of the royalty and licensing fees to the state treasury until the tax credit is recaptured. Proponents say the program has the potential to return millions as companies reimburse the state to cover the cost of credits and create jobs. The purposes of the fund are to provide capital for university entrepreneurial programs; opportunities for students to gain experience in

applying research to commercialization activities; proof-of-concept funding for transforming research and development concepts into commercially viable products and services; entrepreneurial opportunities to transform research into commercial ventures that create jobs within the state; and, tax credits for contributors to university commercialization activities.

The Iowa state legislature recently passed legislation creating a \$500 million version of its Grow Iowa Values Fund, providing 10 years of support for tech-based economic development and other economic development initiatives. The legislation allocates \$35 million per year to the Iowa Department of Economic Development (IDED) for business start-ups, expansions, attraction and retention. Universities will receive \$5 million per year for capacity-building infrastructure in areas related to technology commercialization, entrepreneurship and business growth, and \$7 million will support community college training and retraining programs.

17

Recommendation 17: Develop tax recommendations promoting entrepreneurial activity*(Framework Phase: Business Execution)*

Description: The state of Washington currently has legislation providing R&D tax credits against B&O and sales tax deferrals/exemption on construction for five high-tech sectors (advanced computing, advanced materials, biotechnology, electronic device technology and environmental technology) and additional legislation for machinery and equipment deferrals/exemption related to manufacturing or R&D by a manufacturer. There are also programs that provide relief on manufacturing construction in rural areas. The task force was consistently apprised of the value of greater attention to disincentives during its information gathering process. Stakeholders interviewed suggested a variety of creative ideas, such as a three-year deferral of B&O taxes for early-stage technology companies for whom real revenues often come years after the initial formation of the company. A working group of the Washington Economic Development Commission has developed a draft report “Economic Development Tax Incentive Assessment – Nov. 2005.”

Expected outcomes: This report helps form the basis for specific recommendation of the task force to improve the entrepreneurial climate of the state. Specific recommendations include assuring that the breadth of high tech is covered by credits and exemptions, extending rural programs to the balance of the state, developing a more contemporary definition of high tech manufacturing and examining B&O tax rates and imposition for high tech business particularly as they compare to other industries vital to the state of Washington.

Stakeholders: Technology Alliance, WSA, AEA, WBBA, Northwest Environmental Business Council, Association of Washington Business, Washington Research Council and the Business Roundtable.

Responsible party: The Washington Economic Development Commission working with Technology Alliance and trade associations such as WSA and WBBA as appropriate.

Resources needed: None required.

Schedule for implementation: Prepare recommendation for the Governor and the Washington legislature for the 2007 session.

Measures of success:

- New business starts and expansion, new products, relocation to the state of Washington;
- A stated appreciation by Washington-based companies for Washington as a great place to start, grow and locate a company.

Best Practices: Arizona is launching a tax credit program to encourage angel capital investments in start-up Arizona tech firms. Senate Bill 1335 provides individual investors, limited partnerships or "S" corporations a 10 percent state tax credit per year for three years for investments in qualified technology companies. For investments in qualified biotech firms or for technology businesses located in rural areas, the credit climbs to 12 percent per year for two years and 11 percent the third year. Investments must be a minimum of \$25,000 and only the first \$250,000 of any investment is eligible for the tax credit.

18

Recommendation 18: Develop a high profile business-higher education partnership to create mentoring and national networking opportunities for students and business leaders in Washington State's leading R&D areas

(Framework Phase: Business Execution)

Description: Leaders in the technology community have expressed concern that they often have to look beyond the state to recruit talented individuals with the skills required to grow technology companies. Particular emphasis has been placed on the need to develop and attract executives with the management expertise to grow technology companies beyond the start-up phase. This is reinforced by the fact that while Washington state has one of the highest business creation rates in the country, it also has one of the highest business closing rates. Despite the need to attract top talent from out-of-state and increase the number of business leaders with globally competitive resumes at home, technology initiatives in Washington tend to be focused on engaging the state's existing technology community. The state will benefit from developing a high-profile initiative explicitly focused on engaging leaders from out-of-state and building connections to national networks related to the states most promising technology and R&D areas.

Expected outcomes: To raise the profile of Washington's top research areas, help attract top talent to Washington, and to foster national networking opportunities, universities, technology-based trade associations, and the business community should work together to develop a signature program that connects the next generation of technology leaders—entrepreneurs and students pursuing degrees in technology and business—with seasoned technology and business experts throughout the world. The program should attract top executives to the state and create national exposure for Washington's most promising R&D areas, while creating networking and mentoring opportunities for students and regional entrepreneurs building businesses related to the states leading R&D fields.

Stakeholders: Universities, technology businesses, technology-related trade associations, venture capital community, mentoring programs, professional services firms supporting the technology sector.

Responsible party: Research universities, research institutions, trade associations.

Resources needed: Leadership. Limited funding to be obtained through sponsorships.

Schedule for implementation: Finalize concept within three months; launch within six months.

Measures of success:

- Increased the national profile of Washington state's top research areas;
- Increase the number of national leaders involved in Washington initiatives;
- Increased exposure for students and technology leaders to national initiatives and industry-shaping executives;
- Increase involvement of Washington state technology leaders in national networks, boards, and initiatives.



appendices

appendix 1:

[Technology Commercialization Process]

Updated September 2005. Prepared by the Technology Commercialization Taskforce of the Washington Economic Development Commission, with core contributions by Lee Cheatham and staff from Washington Technology Center, Eric Stenehjem of Pacific Northwest National Laboratory, James A. Severson, Vice Provost for Intellectual Property and Technology Transfer, and James N. Petersen, Vice Provost for Research at Washington State University.

Enhancing Washington State's Economic Benefit from Commercialization of Technology Developed at Our Research Institutions

44

The Washington State Economic Development Commission's (EDC) objective is to enhance the economic benefits of technology commercialization in Washington. The EDC is reaching out to businesses and research institutions from across our state to examine ways in which the State can better facilitate successful commercialization of technology developed at our State's research institutions. This process intends to more fully understand what's working, what's not, and what actions, if any, the State can undertake to improve the economic impact of technology commercialization within Washington.

Background

Important to any discussion of policies and practices that might aid in this regard is an understanding of the role played by technology transfer in, and the importance of other factors to, technology commercialization.

Commercialization involves a handoff from R&D organization to a commercial company.

Scientific breakthroughs are the result of the search for new knowledge within a research institution. Those breakthroughs offer benefit to people and economic growth to regions when they are incorporated into new products by a commercial enterprise. Thus, a handoff between the research institution and the company occurs at some point in the process. Commercialization is all about making this transition happen. Paving the way for a successful transition requires good communications, insight into the markets of the future, understanding of unmet market needs, willing partners on both sides, and enough money to satisfy the needs of the organizations involved.

Commercialization through technology transfer is relatively new.

Technology transfer can be traced to the 1800s when land-grant universities moved technologies directly to the commercial sector without protection, licensing, or associated royalty charges. However, such attempts were infrequent because, prior to 1980, the U.S. government retained ownership of most of the inventions resulting from federally-funded research. It was a difficult and time-consuming (and often unsuccessful) task for an institution to get permission from the sponsoring federal agency to seek commercial outlets for a technological innovation. With no proprietary right to grant and no incentive to seek commercial outlets, technological advances developed at universities and non-profit research institutions were rarely translated into useful products and services for the benefit of the public.

The 1980 Bayh-Dole Act places responsibility for technology transfer.

This changed with the passage of the Bayh-Dole Act of 1980 and its amendments of 1984 and 1986. The Act effectively transformed technology transfer from a passive to a more active process. It provided universities and non-profit research institutions with rights to the technologies and other intellectual properties resulting from research funded in whole or in part by the federal government. It also allowed them to license their technologies to the commercial sector and to use the proceeds from licensing to reward the inventors and to support scientific research and education at the institution.¹ Armed with property rights and the ability to create significant value from their inventions, academic and non-profit research institutions have, since that time, actively sought out new inventions within their institutions; protected those inventions through patent, copyright or other mechanisms; and, diligently pursued outlets for their commercial development.

Basic research is only the starting point for commercialization.

Universities and non-profit research institutions don't manufacture, market or distribute the fruits of their research. Instead, they rely on the tools provided them under the Bayh-Dole Act to seek licensees in the commercial sector willing to do so. The process of finding commercial outlets, however, is more difficult than many realize. Most of our research institutions engage in "basic" research which is defined by the National Science Foundation as being "intended to gain more comprehensive knowledge or understanding of the subject under study, without specific applications in mind" (emphasis added).² Thus a significant portion of the inventions disclosed either have no immediately obvious commercial application or have not been pushed beyond the "proof of principal" phase in their development. Moving new innovations beyond this early phase of development creates "technology risk" that reduces the expectations of immediate returns and commensurately the interest of all but the most risk-tolerant firms and individuals in licensing these technologies.

1 Howard Bremer, Catherine Innes, Christopher McKinney, "Academic Technology Transfer: Driving the Public Use of University Research Results," Association of University Technology Managers, Educational Series No. 6, 2004, p. 2

2 Gregory Graff, Amir Heiman, David Zilberman, "University Research and Offices of Technology Transfer," California Review of Management, Vol. 45, No.1, Fall 2002, p. 91

New ideas and technologies represent risk to established products and companies.

Another obstacle to finding willing licensees among established companies is the risk of disruption. Operating as they do at the boundaries of science and technology—especially with federal funding—our academic and research institutions occasionally discover breakthrough and/or disruptive technologies. These are technologies that represent such a radical departure from the manner in which current market needs are addressed that they require either the creation of new markets and/or threaten with extinction those who dominate existing markets. Established firms, understandably, are reluctant to embrace technologies such as these that may have the potential to render their investments in products, plants and equipment obsolete.

Innovative startup companies champion disruptive technologies.

Technology-based startup companies, including small emerging businesses, represent a particular class of licensees for whom these obstacles are less problematic. They typically demonstrate higher risk tolerances and have historically contributed to the process of championing the commercialization of very-early-stage technologies that suffer from either “technology” or “disruption” risks. In addition, according to the most recent survey data from the Association of University Technology Managers, 83 percent of startups remain within the same state of the institution from which they received their technology.³ Thus, while they are by no means always successful, statistics from the 2002 survey reveal that 63 percent of new companies started since 1980 are still in operation.⁴

Directing economic impact to a specific region is difficult.

Typically, transfers of promising technology take place through licensing between research institutions and companies where the transferred innovations are incorporated into existing products. The licensees are under no obligation to locate or undertake any economic activity (i.e. company operations) in the region from which the licensed technology arises. This blunts the precision with which technology transfer can be used to encourage the focused expansion of technology-based economic activity. While, transferring technology to local startup companies would appear to be an effective tool for stimulating economic activity, the fact is that only about one in ten technology licenses granted by research institutions are made to start-up companies.

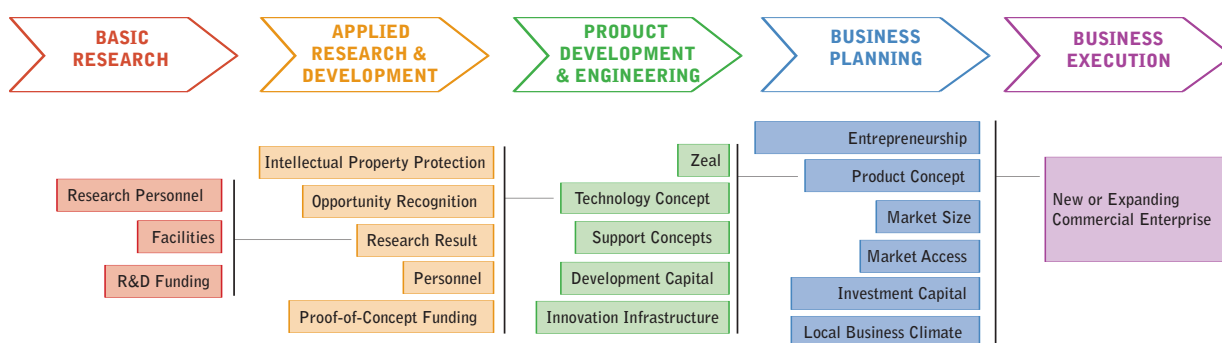
³ AUTM Licensing Survey: FY2002 Edited by Ashley Stevens, Association of University Licensing Managers, 2003, p. 21

⁴ Ibid., p.23

Technology Commercialization Process

The Evolution of an Idea

Translating an idea into a commercial success is not a simple task. Rather it is one aspect of interplay between multiple factors that can result in commercial success. For our purposes, this discussion will focus on those commercially successful enterprises that incorporate a new technology or innovation. Other models might involve existing technologies, products or business models that could be the basis for a profitable business; however, here we will focus on the relationship between technology and commercial success. Technology transfer is just one step in the commercialization process. Along each step of this path, an array of factors must be present for the process to be successful, and each step depends on successful outcomes from the stage preceding it.



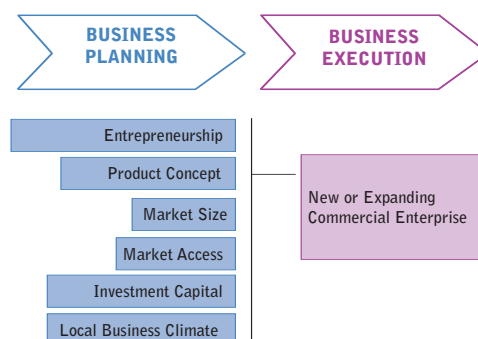
What It Takes to Create a Successful Technology-Based Enterprise

Starting at the right-hand side of the above diagram, at least six elements contribute to a commercially-successful technology-based enterprise. Each is a critical component, with no single element commanding a majority role. In turn, each component is composed of a separate group of factors. For this discussion, we will follow in some detail one of these paths – the Technology Path – to illustrate its role in technology commercialization.

New or Expanding Commercial Enterprise:

Six critical elements must come together in the Business Planning phase to execute a successful technology-based commercial enterprise:

- **Entrepreneurship:** Personnel who have the experience, skill and personal traits to launch, support, manage and promote the new enterprise.
- **Product Concept:** Available, appropriate, demonstrated technology-based products or processes. Ideally, the embodied technology(ies) provide the freedom to deploy products in the chosen markets and create a barrier to make competitor entry difficult.

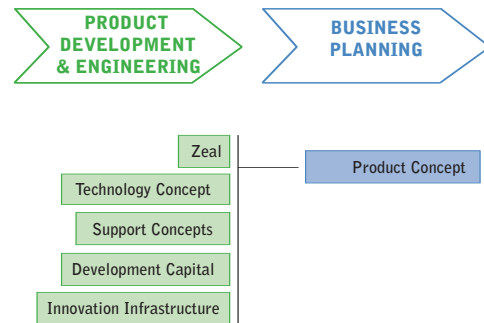


- **Market Size:** Target market for the company's endeavors large enough to provide a return to the investors and well-defined enough to provide clear product definition to the company.
- **Market Access/Channel:** Demonstrated, reliable and affordable mechanisms (channels) for the company to deliver its products and services into their target markets.
- **Investment Capital:** Willing, supportive capital resources available to be invested in the enterprise.
- **Local Business Climate:** Supportive infrastructure of public services (e.g. available facilities, land, taxes, policy), suppliers, and support organizations (e.g. legal, financial, marketing, production services).

Product Concept

The Product Concept, which is one of the factors required for building new or expanded businesses, is in turn dependent on five critical elements coming together in the Product Development and Engineering phase. The five elements are:

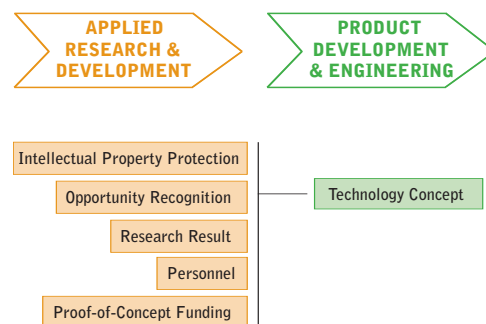
- **Zeal:** At the pre-enterprise stage, there need to be fully-committed technology and entrepreneurial champions with the energy, enthusiasm, competence, perseverance and high tolerances for risk and technological ambiguity who are willing to “invest” the time and effort to successfully transform the technology concept into a viable product.
- **Technology Concept:** One or more scientific or IP-based ideas that have been shown to have potential commercial value. The market application must have been identified and the expected distinctive benefits of this technology concept must have been outlined with respect to the targeted market areas.
- **Support Concepts:** Business models, marketing channels and other business dimensions must also be outlined that mutually support the technology concept.
- **Development Capital:** Sufficient capital to allow the development of prototype and demonstration products. The performance and “manufacturability” must be demonstrated.
- **Innovation infrastructure:** The local environment must support entrepreneurs, technology developers and researchers by providing an easy, free-flowing exchange of ideas and best practices. In addition, facility, mentoring, and business planning support must be available.



Technology Concept

The Technology Concept arises from the interplay of eight elements in the Applied Research and Development phase. This phase has the most variables, with five components needed for advancement towards a commercially successful enterprise.

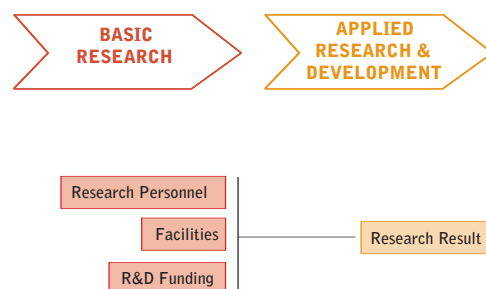
- **Intellectual Property Protection:** Investment in protection, either by patent, copyright or trade secret, to protect the features of the Research Result that may become a commercial product.
- **Opportunity Recognition:** Ideas about those applications in which the research result might be valuable. This is typically the result of creative insight and experience, not a prescriptive process.
- **Research Result:** Scientific, viable results from a research project that outline a new physical, biological or other process, material or mathematical relationship. At this point the science is proven, but a practical/market application may have only been suggested, not exhaustively investigated.
- **Personnel:** Selecting and recruiting appropriate people to carry the scientific concept through this stage of its development.
- **Proof-of-Concept Funding:** Capital/funding available to investigate the commercial viability of a scientific or research result in a particular market segment.



Research Result

The research result obtained in the Applied Research and Development phase refers to a finding that might form the basis of a technology concept with commercial potential. Achieving such a result is a formidable process.

- **Research Personnel:** At universities and non-profit laboratories there may be hundreds of individual researchers working on hundreds of different research projects at any given time. And, at any given time, only one out of a hundred of these researchers may produce anything having commercial potential. For example, the portion of Washington state's research universities' faculty engaged in research with commercial potential is about 1 percent (estimated by University of Washington and Washington State University). Therefore, in Washington State, 300 to 400 faculty are potential targets for "commercializable ideas."
- **Research Facilities:** Research facilities and equipment.
- **R&D Funding:** Washington state research institutions benefit from more than \$2 billion annually that comes into Washington from federal sources at this level.





What is Technology Transfer?

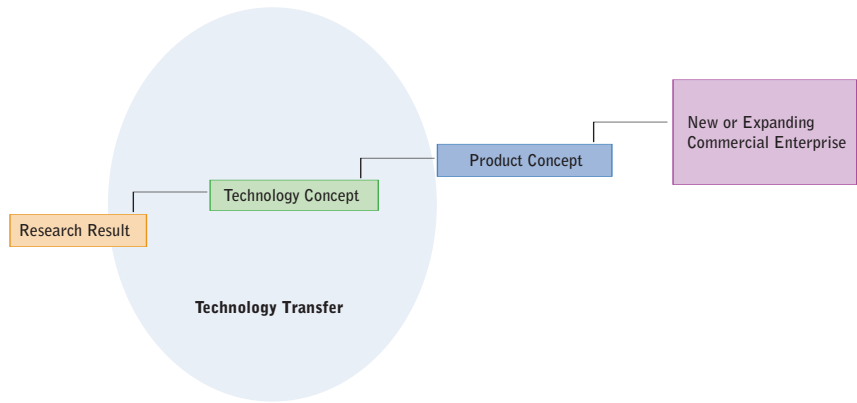
Technology transfer is the process by which knowledge, technology and science developed by researchers in academic institutions or laboratory facilities are transferred to the public or private sector for the purpose of developing it into a marketable process or product. The technology transfer process is shared among a variety of partners, including:

- Universities
- Industries and Businesses
- Public Laboratories
- Non Profit Research Institutions
- Federal, State and Local Government

From the state or federal government standpoint, the potential for technology transfer is measured in how the research will have practical application for public benefit. From industry’s standpoint, it is how the research will advance a company’s growth and competitiveness. From an economic development standpoint, these two interests merge to determine how the research may ultimately translate into jobs, contributing to existing industry clusters that fuel a multiplier effect on our state’s applicable employment base.

What is the Role of Tech Transfer in Commercialization?

Technology transfer identifies innovations in research, protects them as appropriate and makes them broadly available to the commercial sector for translation into goods and services. Technology transfer, then, provides for a collaborative transition of innovations in science and technology into the private sector for their further development and commercialization.



For the transfer to be successful, the following factors must all be in play:

- Identification:* Newly created Research Results must be disclosed and evaluated for commercial potential.
- End Users:* There need to be companies and investors that have available the culture, resources and time necessary to incorporate new ideas into product development schemes.
- Transfer:* The transition of these innovations to the private or public sector to facilitate the further development of the Research Results and Technology Concepts into new products, processes, materials, or services that enhance industry competitiveness.

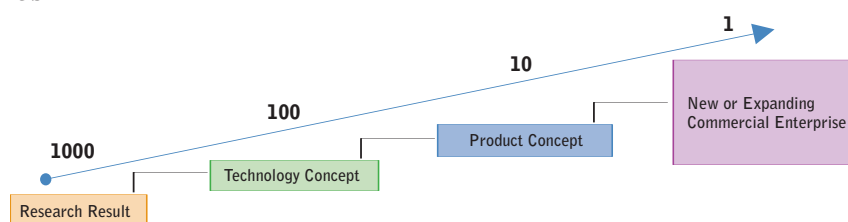
Development: Resources must be in place to assist in providing sufficient ongoing investment and development to turn Research Results and Technology Concepts into Technology Solutions that drive the development of new products. These include funding sources, partnerships, and support services.

This ongoing support infrastructure encourages:

- Further R&D activities
- Early-stage, angel, and venture capital investment in technology companies
- Profitability from spin-offs, market share, licensing royalties
- Employment growth and new job creation
- Improved consumer products and services.

Ratio of Ideas to Companies

Many people believe there is a correlation between research funding and company starts. There is. However, as discussed above, the process of moving from



raw technology to transferable technology to commercial technology-based products and successful new businesses requires a number of steps that make the ratio between company starts and research funding non-linear.

Nationally, the Association of Technology Managers (AUTM) finds that on average there is one new company created for each \$60 million spent on research. National statistics show that spinout/start-up companies account for 0.1 percent (1 in 1000) of the total number of technology licenses granted by research universities. This translates roughly into one new business start for every 1,000 research projects as an average estimate; actual data varies widely based on many factors already discussed. However, this ratio varies in accordance with the presence of the myriad of other factors needed make it possible to move from raw technology to company starts. Entrepreneurs and the commercialization process rely on the presence of investment capital (at several levels), the zeal of technologists willing to invest their time and talents, and the presence of markets to transform raw technologies into commercially relevant products and companies.

Additional data compiled by AUTM suggests that only a fraction of the license transactions completed by research institutions are done with start-up companies and that many more Research Results and Technology Concepts are licensed to existing companies—large and small—for incorporation into existing product lines.

Whether technology-based companies are retained in the region that produced the technology and whether they experience higher or lower than average rates of success is dependent in large part on the state and local business climate and the regional infrastructure in place to nurture and support them.

table of organizations

**Association of University
Technology Managers (AUTM)**
www.autm.net

**Department of Community, Trade
and Economic Development
(CTED)** www.cted.wa.gov

**National Association of Seed and
Venture Funds** www.nasvf.org

**Spokane Intercollegiate Research
and Technology Institute (SIRTI)**
www.sirti.org

**State Science and Technology
Institute** www.ssti.org

**Washington Technology Alliance
(TA)** www.technology-alliance.com

**Washington Research Technology
Transfer Alliance (WRITTA)**

**Washington Technology Center
(WTC)**
www.watechcenter.org

International professional association recognized as the leading organization for best practice and performance statistics for university technology transfer.

CTED is the state agency that invests in Washington's communities, businesses and families to build a healthy and prosperous future.

National association promoting best practices and formation of early stage capital.

SIRTI is a state agency with responsibilities for supporting early stage/start up companies.

National organization supporting state technology-based economic development organizations.

The TA is a statewide consortium of leaders from Washington's high tech businesses, research institutions, and the community dedicated to Washington's economic success.

Informal association of technology commercialization functions from each of Washington states largest research institutions: The four charter members are University of Washington, Pacific Northwest National Laboratory, Fred Hutchinson Cancer Research Center and Washington State University.

WTC is Washington's state-chartered technology-based economic development organization with responsibility for supporting commercialization of research and supporting growing companies across the state.

references and cited documents

UW/WSU joint proposal

www.olympia.wsu.edu/News/2006_News_Two.stm

WTC 2003-2008 Strategic Plan

www.watechcenter.org/index.php?p=Our+Strategic+Plan&s=25

Ethics Act (RCW 42.52)

apps.leg.wa.gov/rcw/default.aspx?cite=42.52

Life Sciences Discovery Fund - authorizing legislation

www.leg.wa.gov/pub/billinfo/2005-06/Pdf/Bills/Session%20Law%202005/5581-S2.SL.pdf

Innovation Index

www.watechcenter.org/downloads/2005index_longversion.pdf

UW Office of Technology Transfer

depts.washington.edu/techtran/

WSU Office of Technology Transfer

research.wsu.edu

Fred Hutchinson Cancer Research Center Office of Technology Transfer

www.fhcrc.org/science/tech_trans/

PNNL Office of Technology Transfer

www.pnl.gov/edo/

Prosperity Partnership

www.prosperitypartnership.org



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The Economic Development Commission wishes to thank the taskforce members for developing this report. Their insight and effort over the past two years has led to this balanced, action-oriented document.

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